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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,018	04/15/2004	Chiwoei Wayne Lo	6317P090D2	9071

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APPLIED MATERIALS/BLAKELY
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EXAMINER

BERMAN, JACK I

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,018

Applicant(s)

LO ET AL.

Examiner

Jack I. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/15/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 5 needs to depend from either claim 3 or claim 4 since only these claims provide an antecedent basis for “n”. In claim 15, since an electrostatic electrode is by definition a single element, it cannot comprise a plurality of electrostatic lens elements; however, an electrostatic lens element may comprise a plurality of electrostatic electrodes. It appears that this is what Applicant is trying to claim in claim 15 and the claim has been so treated on the merits.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 6, 9-14, 16, 18-20, 23, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Hamaguchi et al. Hamaguchi et al. discloses a magnetic focusing lens apparatus (16, 24, 34, 36, 62) for focusing multiple substantially parallel electron beams, comprising: a coil (212 in Figure 12A and in the specification beginning at line 63 in column 14) energized by an adjustable DC electric current to generate a DC magnetic field (while Hamaguchi et al. does not

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specify that the electric current is DC, it must inherently be so because an AC current would not be able to produce a stable magnetic field for focusing the electron beams); and a plurality of magnetic pole pieces (240a, 240b in Figures 15A and 15B) excited by the electric current, each of the plurality of magnetic pole pieces having substantially similar lens characteristics and being disposed to focus one of the multiple substantially parallel charged particle beams approximately in a plane orthogonal to a direction of propagation of the multiple substantially charged particle beams (see line 54 in column 16 through line 54 in column 17). At line 29 in column 20 through line 25 in column 21, Hamaguchi et al. teaches to provide a magnetic coil (542) energized with a controllable current for each of the beams associated with each of the magnetic pole pieces to act as an associated focus adjustment. This focus adjustment inherently provides a field of less strength than that of the outer magnetic coil (212) because of its smaller size. At line 11 in column 19 through line 28 in column 20, Hamaguchi et al. teaches that this focus adjustment could alternatively be performed by electrostatic elements (532) energized with a controllable voltage for each of the beams. Each of these focus adjustment means individually focuses the beams at a surface of a workpiece in the plane orthogonal to a direction of propagation of the beams, thereby to correct for changes in a position of the workpiece. The Hamaguchi et al. apparatus also constitutes a lens apparatus for focusing multiple charged particle beams, comprising: a circuit controlled with an adjustable voltage or electric current to generate an adjustable focusing field; and a plurality of lens elements energized by the circuit where each of the plurality of lens elements is disposed to focus one of the multiple charged particle beams. Hamaguchi et al. also discloses a multi-source charged particle gun apparatus for generating a plurality of substantially parallel charged particle beams, comprising: a plurality of charged

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particle sources (10), each of the plurality of charged particle sources provided with at least one electrode (13, 102 in Figures 33 and 34A and B) energized by an adjustable voltage to extract a plurality of substantially parallel charged particle beams, one beam being from each of the plurality of charged particle sources; a magnetic coil (212) energized by an adjustable electric current to generate a magnetic field; a plurality of magnetic pole pieces (240a, 240b in Figures 15A and 15B) excited by the electric current and disposed to control the focus of each of the multiple substantially parallel charged particle beams; and a moving stage (46) for holding a workpiece (44) onto which the beams are directed. The movement of the stage must inherently be either scanning or stepping because all stage movements are one or the other of these two types of movements. Hamaguchi et al. further teaches that the apparatus can be used for imaging or inspecting by providing a plurality of detectors (50, 700), one detector associated with each of the multiple substantially parallel charged particle beams to produce a stream of image data and an image processor (backscattered electron processing unit 99) coupled to process the plurality of image data streams. Such apparatus is inherently capable of detecting defects in a workpiece.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-5, 7, 8, 17, 21, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamaguchi et al. The arrangement of Hamaguchi et al.'s pole pieces, including the number of pole pieces along each side of an array, the spacing between pole pieces, and the provision of additional pole pieces around the periphery of the array would have been obvious matters for routine experimentation that a person having ordinary skill in the art would adjust in accordance with a desired pattern for the beams to draw on the workpiece. At lines 52-62 in column 32, Hamaguchi et al. teaches that the charged particle source may be a thermoelectron source, and at lines 7-8 in column 33 that the source may be a field emission source. The possibility of a TFE (thermal field emitter) is not mentioned, but at paragraph [0032] of the instant specification, Applicant admits that such TFE type emitters are known in the art and the use of such electron emitters instead of the thermal electron sources or field emission electron sources used by Hamaguchi et al. would have been an obvious substitution of equivalent parts. The amount of travel of Hamaguchi et al.'s stage (46) along the X and Y axes and the amount of reduction of this travel caused by the spacing apart of the beam columns would have been obvious matters for routine experimentation that a person having ordinary skill in the art would adjust in accordance with a desired pattern for the beams to draw on the workpiece.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamaguchi et al. in view of Honjo et al. While Hamaguchi et al. does not specify the nature of the electron detectors (700), Honjo et al. teaches, at line 66 in column 7 through line 3 in column 8, that the

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use of semiconductor diodes as electron detectors is known in the art and it would have been obvious to a person having ordinary skill in the art to use these known detectors as Hamaguchi et al.'s detectors of unspecified type.

Claims 14, 15, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Honjo et al. Honjo et al. discloses an electrostatic focusing lens apparatus for focusing multiple substantially charged particle beams, comprising: an electrostatic lens element (100) energized by an adjustable voltage to generate a plurality of electrostatic lens fields; and wherein the electrostatic lens element (100) comprises a plurality of electrostatic electrodes (102) energized by the adjustable voltage where each of the plurality of electrostatic electrodes is disposed to focus one of the multiple substantially parallel charged particle beams approximately in a plane orthogonal to a direction of propagation of the multiple substantially parallel charged particle beams. Honjo et al. also discloses, at columns 13-14, a multi-beam inspection system comprising: a moving stage (31) for supporting a workpiece (S) subject to inspection and mounted in a chamber; a multi-beam charged particle column that generates a plurality of substantially parallel charged particle beams (as illustrated in Figures 19 and 20), each of the plurality of charged particle beams being incident on portions of the workpiece thereby to produce a plurality of streams of image data; and an image processor (305) coupled to process the plurality of image data streams, thereby to detect defects in the workpiece (see lines 19-22 in column 1). Since Honjo et al.'s sample stage moves, it must be either a stepping stage or a scanning stage because, as is discussed above, all movements made by a stage must be either scanning (i.e. the sample is irradiated by the electron beams while the stage is moving) or

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stepping (i.e. the stage stops moving during the actual irradiation). There are no other possibilities.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Maekawa et al. and Shirai et al. both teach the use of a common magnetic coil to form focusing magnetic fields in a plurality of electron beam columns simultaneously.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jack I. Berman
Primary Examiner
Art Unit 2881

jb
9/28/05